International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM 2018 vol.18 N2.1, pages 325-332

Development of the software package “interactive automated system for optimal regressions modeling”

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© SGEM2018. Since the global information networks are well developing and the amount of information is rapidly increasing, an automatization of the analytical data processing has become more urgent. In their combination a solid basis for the improvement of management and operation packages in any field of activity arises. It should be noted the initial assumptions of the regression analysis are always observed. However, discovering that the preconditions are violated is not sufficient. A specific software package containing particular measures that come into force under these conditions are required. Thus, for the effective use of adaptive regression modeling approach (ARM) one should the apply a particular software package to automate the process of taking observations, analyze the quality of the models produced and analyze the compliance with the assumptions of regression analysis using the ordinary least squares method (LSM), as well as implement the appropriate procedures to adapt. The purpose of this study is to improve the performance of the computational modeling process by automating the search for the optimal set of regressors, and analyze it. To achieve this goal, it is necessary to solve a number of problems: 1) Development of the software package "Interactive Automated System for Optimal Regressions Modeling" (IASORM) based on connecting library quality analysis model with the compliance status of assumptions; 2) Implementation of the algorithm scenario of automatic data processing with the functional connection of libraries. The software package IASORM is a specialized system that implements the strategy of regression modeling. Automated script processing can improve the effectiveness of the existing methods of the package. Embedded library of the quality analysis and of the compliance model assumptions extend functionality for the user and is aimed at identifying the adequacy of models and observations in order to detect violations of the basic assumptions of regression analysis. Proposed scenario increases the computational process speed compared to interactive computing. IASORS implements the strategy of statistical (regression) modeling. This software package can be used to create regression models and predict dynamic processes.

http://dx.doi.org/10.5593/sgem2018/2.1/S07.041

Keywords

Adaptive regression modeling, Interactive automated systems, Robust analysis, Software package

References

[1] Valeev, S.G., Kurkina, S.V. Programmnaya realizaciya DRM-podhoda dlya obrabotki i analysa vremennyh ryadov, Izv. vuzov. Geodeziya i aerophotos'emka, 2006, no. 5, pp. 10-21.

[2] Valeev S.G., Regressionnoe modelirovanie pri obrabotke nablyudenyi, Kazan: FAN, pp. 1-296, 2001.

[3] Nefedjev Y.A. and Nefedjeva A.I., Determination of refraction anomalies by global inclinations of airstratas of identical density, Astronomische Nachrichten, Vol. 326/Issue 8, pp. 773-776, 2005.

[4] Demin S.A., Panischev O.Yu. and Nefedyev Yu.A., Dynamic and Spectral X-Ray Features of the Micro-quasar XTE J1550-564, Kinematics and Physics of Celestial Bodies, 30, pp. 63-69, 2014.

[5] Sokolova M.G., Kondratyeva E.D. and Nefedyev Y.A., A comparative analysis of the D-criteria used to determine genetic links of small bodies, Advances in Space Research, Vol. 52/ Issue 7, pp. 1217-1220, 2013.

[6] Rizvanov N.G., Nefed'ev Yu.A. and Kibardina M.I., Research on selenodesy and dynamics of the Moon in Kazan, Solar System Research, Vol.41/ N 2, pp.140-149, 2007.

[7] Sokolova M.G., Nefedyev Y.A. and Varaksina N.Y., Asteroid and comet hazard: Identification problem of observed space objects with the parental bodies, Advances in Space Research, Vol. 54/ Issue 11, pp. 2415-2418, 2014.

[8] Sokolova M., Nefedyev Y., Sergienko M., Demina, N. and Andreev, A., Analysis of the Lyrids' meteor stream structure for long timeslots, Advances in Space Research, Vol. 58/ Issue 4, pp. 541-544, 2016.

[9] Nefedjev Yu.A. and Rizvanov N.G., The results of an accurate analysis of EAO charts of the Moon marginal zone constructed on the basis of lunar occultations, Astronomosche Nachrihten, AN 323, pp.135-138, 2002.

[10] Rizvanov N.G. and Nefedjev Yu.A., Photographic observations of Solar System bodies at the Engelhardt astronomical observatory, Astronomy and Astrophysics, N 444, pp. 625 – 627, 2005.

[11] Varaksina N.Y., Nefedyev Y.A., Churkin K.O., Zabbarova R.R. and Demin, S.A., Lorentzian' analysis of the accuracy of modern catalogues of stellar positions, Journal of Physics: Conference Series, Vol. 661, P. 012015, 2015.

[12] Lapaeva V.V., Meregin V.P. and Nefedjev Y.A., The Study of the Local Fluctuations of the Earth's Crust Using Data of Latitude Observations, Geophysical Research Letters, 32, L24304, 2005.

[13] Nefedyev Y., Valeev S., Mikee, R., Varaksina, N. and Andreev, A., Analysis of data of "CLEMENTINE" and "KAGUYA" missions and "ULCN" and "KSC-1162" catalogues, Advanced in Space Research, №50, pp. 1564 – 1569, 2012.

[14] Demin S.A., Panischev O.Yu. and Nefedyev, Yu.A., Auto-and cross-correlation analysis of the QSOs radio wave intensity, Journal of Physics: Conference Series, Vol. 661/ Issue 1, no. 012003, 2015.

[15] Varaksina N.Y., Nefedyev Y.A., Churkin K.O., Zabbarova R.R. and Demin S.A., Selenocentric reference coordinates net in the dynamic system, Journal of Physics: Conference Series, Vol. 661, P. 012014, 2015.